AMLOY is a group of amorphous alloys which, in contrast to other metals and classic alloys, have an unstructured non-crystalline structure. The alloy system is chosen in a way that no phase transition from liquid to solid exists which in turn leads to near net shape components. With the absence of lattice defects, no grain and phase boundaries and no related composition variations exist. Amorphous metals show a completely new combination of properties.

ADVANTAGES OF AMLOY

- Precise net shape manufacturing of amorphous components
- Miniaturization by combining a high strength with excellent ductility in one material
- Longer lifetime due to less abrasion
- Simplified specifications and product designs due to isotropic material behavior
**PROPERTIES OF AMLOY**

**MECHANICAL**
- High yield strength combined with excellent ductility (2 times higher than steel)
- High fracture toughness
- High hardness, good wear and abrasion resistance (like ceramic)
- Isotropic behavior

**CHEMICAL AND MEDICAL**
- High corrosion resistance due to lack of grain and phase boundaries
- Biocompatibility of some alloys
- Low solidification shrinkage
- Thermoplastic forming at glass transition temperature

**ELECTRICAL AND MAGNETIC**
- High magnetic permeability
- Electrical resistivity nearly temperature independent
- Easy to magnetize and demagnetize

With this combination of properties, amorphous metals outplay steel, titanium and other raw materials. They meet the growing material requirements and fulfill the markets’ needs for high tech applications.

**AVAILABLE AMLOY ALLOYS**

Zirconium-based: AMZ4, VIT105  
Copper-based: AMC4

---

### Zr-based – AMZ4

<table>
<thead>
<tr>
<th>Element</th>
<th>Concentration wt%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zr</td>
<td>Balance</td>
</tr>
<tr>
<td>Cu</td>
<td>24</td>
</tr>
<tr>
<td>Al</td>
<td>4</td>
</tr>
<tr>
<td>Nb</td>
<td>2</td>
</tr>
</tbody>
</table>

### Zr-based – VIT 105

<table>
<thead>
<tr>
<th>Element</th>
<th>Concentration wt%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zr</td>
<td>Balance</td>
</tr>
<tr>
<td>Cu</td>
<td>16</td>
</tr>
<tr>
<td>Ni</td>
<td>12</td>
</tr>
<tr>
<td>Ti</td>
<td>3</td>
</tr>
<tr>
<td>Al</td>
<td>4</td>
</tr>
</tbody>
</table>

### Cu-based – AMC4

<table>
<thead>
<tr>
<th>Element</th>
<th>Concentration wt%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cu</td>
<td>Balance</td>
</tr>
<tr>
<td>Ti</td>
<td>26</td>
</tr>
<tr>
<td>Zr</td>
<td>16</td>
</tr>
<tr>
<td>Ni</td>
<td>8</td>
</tr>
<tr>
<td>Sn</td>
<td>4</td>
</tr>
</tbody>
</table>

---

### Properties | Value
--- | ---
Density (g/cm3) | 6.68
Liquidus temperature (°C) | 920
Solidus temperature (°C) | 870
Glass transition temperature Tg (°C) | 400
Crystallization temperature Tx (°C) | 475
Crystallization enthalpy ΔH (J/g) | -47
Young’s modulus (GPa) | 87
Poisson’s ratio | 0.35
Bending yield strength (GPa) | 2.3
Tensile yield strength (GPa) | 1.6
Compressive yield strength (GPa) | 1.7
Vickers Hardness (HV5) | 480

### Properties | Value
--- | ---
Density (g/cm3) | 6.60
Liquidus temperature (°C) | 830
Solidus temperature (°C) | 781
Glass transition temperature Tg (°C) | 403
Crystallization temperature Tx (°C) | 469
Crystallization enthalpy ΔH (J/g) | -47
Young’s modulus (GPa) | 89
Poisson’s ratio | 0.37
Bending yield strength (GPa) | 2
Tensile yield strength (GPa) | 1.7
Compressive yield strength (GPa) | 1.6
Vickers Hardness (HV5) | 540

### Properties | Value
--- | ---
Density (g/cm3) | 6.89
Liquidus temperature (°C) | 870
Solidus temperature (°C) | 770
Glass transition temperature Tg (°C) | 410
Crystallization temperature Tx (°C) | 465
Crystallization enthalpy ΔH (J/g) | -47
Young’s modulus (GPa) | 115
Poisson’s ratio | N/A
Bending yield strength (GPa) | 2.9
Tensile yield strength (GPa) | N/A
Compressive yield strength (GPa) | N/A
Vickers Hardness (HV5) | 580